

MORPHOMETRIC ANALYSIS OF *CRYODRACO* SPECIMENS (NOTOTHENIOIDEI: CHANNICHTHYIDAE) FROM TERRA NOVA BAY, ROSS SEA *

by

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ABSTRACT. - Biometric and meristic characteristics of ten specimens of *Cryodraco* caught off Terra Nova Bay, Ross Sea during three Italian Antarctic Expeditions are reported and discussed. The information in literature did not allow an unambiguous taxonomic diagnosis of the studied specimens showing some but not all the distinctive characters of *Cryodraco atkinsoni*. For the taxonomic diagnosis of the genus *Cryodraco* it is suggested to select those morphological characters which show minor changes with the ontogenesis.

RÉSUMÉ. - Analyse morphométrique de spécimens de *Cryodraco* (Notothenioidei: Channichthyidae) provenant de la Baie Terra Nova, Mer de Ross.

Les caractéristiques biométriques et méristiques de dix exemplaires de *Cryodraco* capturés dans la Baie Terra Nova, Mer de Ross, pendant trois Expéditions antarctiques italiennes ont été étudiées. Les informations de la littérature n'ont pas permis une claire identification des exemplaires qui montrent la plupart des caractères distinctifs, mais pas tous, de *Cryodraco atkinsoni*. Pour la diagnose taxonomique du genre *Cryodraco* il convient de sélectionner les caractères morphologiques qui ne changent pas significativement pendant l'ontogenèse.

Key-words. - Channichthyidae, *Cryodraco*, PSE, Antarctic Ocean, Taxonomy.

The genus *Cryodraco* (Channichthyidae) was first described by Dollo (1900), who named the specimen obtained from the Bellingshausen Sea *Cryodraco antarcticus*.

Pappenheim (1912) reported from the Davis Sea three channichthyid fishes measuring 168, 69 and 30 mm in length under the name *Pagetodes antarcticus*. The largest specimen (168 mm) was redescribed by Regan (1913) as a new species, *Cryodraco pappenheimi*. Later on, the holotype, the only known specimen of this species, deposited at the Museum für Naturkunde der Humboldt Universität, Berlin, was lost. Hureau (1985) provisionally considered *C. pappenheimi* as a junior synonym of *C. antarcticus*. Recently, Iwami and Kock (1990), stated the description of this species to be more closely related to the genus *Chionodraco* than *Cryodraco*.

Another species of the genus, namely *Cryodraco atkinsoni*, was described by Regan (1914) from the Ross Sea, but Norman (1938), following the description of Waite (1916), considered this species as a junior synonym of *C. antarcticus*. However, from a collection of fish trawled in the Ross Sea, Iwami and Abe (1981) distinguished two spe-

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cimens more similar to the *atkinsoni*-form from other seven specimens identified as *C. antarcticus*. In addition, Iwami and Kock (1990) re-evaluated the taxonomic status of *C. atkinsoni* by detailed studies of many *Cryodraco* specimens. They selected five distinctive criteria to separate *atkinsoni* from *antarcticus*. Recently, Evseenko (1994) found one juvenile *C. atkinsoni* in the Weddell Sea.

Miller (1993) validated the three species mentioned above and denied the presence of three lateral lines as a distinctive character of *Cryodraco* genus. Conversely, Balushkin (1996) considered only the *antarcticus* and *atkinsoni* species as belonging to the genus *Cryodraco*.

During three Italian Antarctic Expeditions carried out in the austral summers 1987-88, 1990-91 and 1994-95 off Terra Nova Bay (Ross Sea), we have collected ten specimens of *Cryodraco*. The identification of these individuals was difficult, because some morphological characteristics do not agree with the distinctive characters of the species reported in literature (Evseenko, 1994; Iwami and Kock, 1990; Miller, 1993).

In this paper some biometric and meristic characteristics of specimens caught off Terra Nova Bay are reported and discussed in order to contribute to the taxonomy of the genus *Cryodraco*, focusing the attention on those morphological characters that are still controversial.

MATERIAL EXAMINED

On the whole, ten specimens of *Cryodraco* were collected in the coastal waters near the Italian Station of Terra Nova Bay in the Western Ross Sea. All specimens were sexed (when possible), measured as total and standard lengths to the nearest millimeter below and weighed (guttated weight in grammes). Some meristic counts and morphological characteristics were then recorded in order to identify the species by means of the identification keys reported in literature (Miller, 1993; Evseenko, 1994). These data, as well as the sampling data, are summarized in table I. Moreover, to make the comparison easier, we report the main diagnostic characters referring to the three species of the *Cryodraco* genus (Table II).

As a useful material for comparative studies, specimens 1 and 2 (see Table I) are preserved at the Museum of Natural History of Genoa (catalogue number c.e. 48141 and c.e. 48143 respectively), and specimen 3 belongs to the fish collection of the National Museum of Antarctica, Department of Genoa (catalogue number 1350).

DISCUSSION

In agreement with the more recent studies that considered the subdivision of the genus *Cryodraco* in different species (Evseenko, 1994; Iwami and Kock, 1990; Miller, 1993; Balushkin, 1996), the analysis of the samples of Terra Nova Bay shows that all the specimens collected should be identified as *C. atkinsoni*, except for some diagnostic characters discussed below.

First of all, we exclude that our specimens belong to the species *C. pappenheimi*, both for the characteristics of the head (larger) and of the interorbital width (wider), as well as mainly for the lack of lower lateral line and the low number of anal fin rays (less than 40) of this species (see Tables I and II for comparison).

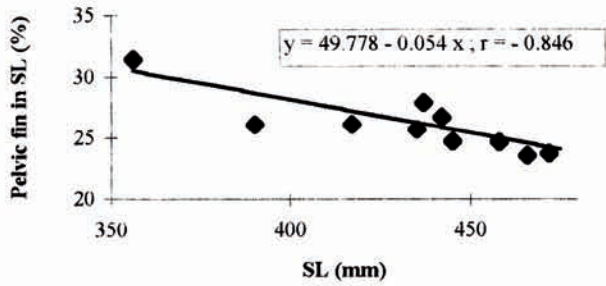


Fig. 1. - Change of relative pelvic fin length with fish size. Linear regression of these parameters is reported in the box.

As mentioned by some authors (Iwami and Abe, 1981; Miller, 1993; Evseenko, 1994; Balushkin, 1996) and here summarized in table II, the most distinctive characters of the two other species are the following: the dark blotch on the posterior margin of the caudal fin and the rostral spine (both present in *C. antarcticus* and absent in *C. atkinsoni*), the origin of the lower lateral line above the base of anal fin rays (4th-7th anal fin ray in *C. antarcticus* and 11th-13th in *C. atkinsoni*), the relative length of pelvic fin (it reaches the 12th-31st anal fin ray in *C. antarcticus* and the 4th-9th in *C. atkinsoni*) and finally the position of the anal fin origin relatively to the second dorsal fin origin (behind in *C. antarcticus* and before in *C. atkinsoni*).

Table II. - Diagnostic characters of the three species belonging to the genus *Cryodraco*.

Diagnostic characters	<i>Cryodraco antarcticus</i>	<i>Cryodraco atkinsoni</i>	<i>Cryodraco pappenheimi</i>
1st dorsal fin rays	III - V	III	V
2nd dorsal fin rays	40 - 45	42	45
Anal fin rays	42 - 46	46	38 - 39
Pectoral fin rays	22 - 27	-	22
Pelvic fin rays	1 - 5	1 - 5	1 - 5
HL in SL	3.1 - 3.3	3.2	2.6
IL in HL	4.6 - 5	4.6	4
Snout in HL	2	2	2
Eye in HL	4 - 5.2	5	5
Pectoral fin in HL	1.7	1.6	-
Pelvic fin to HL	1.7 - 2	1.3	-
Pelvic fin end at anal fin ray	12th - 31st	4th - 9th	-
Origin of the lower lateral line above the base of anal fin ray	4th - 7th	11th - 13th	-
Presence of black blotch on caudal fin	yes	no	-
Presence of rostral spine	yes	no	-
Position of anal fin origin relative to second dorsal fin origin	behind	before	-

Our specimens show all the distinctive characters of *C. atkinsoni*, except for the latter (see Table I). Moreover, it is noteworthy that the smaller relative length of the pelvic fins than one reported both in literature and in the identification keys, is probably due to the large size of our specimens. Indeed, the relative length of pelvic fin clearly decreases with increasing fish size (Fig. 1). Changes with age in the relative length of pelvic fins are however well recognized (Iwami and Abe, 1981). Similarly, the relative position of anal and dorsal fin origin changes considerably in our samples, although it always disagrees with what is reported in the literature for *C. atkinsoni* (see Tables I, II). Waite (1916) already noted the variability of this character due to individual difference in the origin of the anal fin.

So, we think these morphological characters would be cautiously considered for a clear taxonomic identification, at least for the large-sized specimens. Conversely, the origin of the lower lateral line as a distinctive character between the two species (*C. antarcticus* and *C. atkinsoni*) appears the most useful tool, mostly because changes of it with age do not seem to have been previously recorded (Iwami and Abe, 1981). In addition, the dark blotch on posterior margin of caudal fin and the rostral spine could also be used in their identification. It is therefore advisable to select for the taxonomic diagnosis of the genus *Cryodraco* those morphological characters which show minor changes with the ontogenesis.

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